displaylite
ADVANCED DISPLAY SOLUTIONS

DEFENDER

User's Manual

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1. Introduction

Using this manual

We recommend that you take a few minutes to read through the user's manual before installing and switching on your monitor. All chapter headings and subheadings are listed in the table of contents.

The DEFENDER is a rugged state of the art flat panel TFT LCD monitor designed to operate in demanding applications.

Features

- High quality TFT colour LCD monitor
- 15 way HDD (VGA) analog Input. Optional: DVI-D (digital) & video (composite and S-video)
- Compatible with sync on green (SOG) and composite sync video signals.
- On Screen Display (OSD) system
- Wide viewing angle
- Automatic set-up
- Space saving, compact case design
- Optional touchscreen (various technologies available)
- Choice of: 19" rack mount, panel mount, metal case and open frame
- Anti-reflective protective glass (excluding open frame). Optional: Polycarbonate & laminated glass (excluding open frame)
- Front panel designed to meet the sealing requirements of IP65 (rack/panel mount versions)
- Optional stainless steel front panel (rack/panel mount versions)
- Extended temperature range
- 12VDC power input (supplied with external AC to DC PSU)
- Designed and manufactured in the UK by Displaylite

2. Safety precautions

WARNING

If you notice anything abnormal while operating this product, such as smoke or fumes, unplug the monitor and contact your supplier immediately. Further use may be dangerous and could cause fire or electric shock.

NEVER REMOVE THE CASE

High voltage circuits! Removing the safety cover (or back) may expose you to the danger of fire or electric shock. Refer servicing to qualified service personal.

DO NOT OBSTRUCT THE MONITOR

Do not obstruct or poke objects into the monitor as this may cause fire, electric shock or damage.

OPERATE WITH THE SPECIFIED POWER SUPPLY

Only operate the monitor with the specified power supply. Use of an incorrect voltage will cause malfunction and can result in fire or electric shock.

PROTECT THE CABLES

Do not pull or bend the power cable and signal cable. Do not place the monitor or any other heavy objects on the cables. If damaged, the cables may cause fire or electric shock.

ADVERSE WEATHER CONDITIONS

It is advisable not to operate the monitor during a heavy thunderstorm as the continual breaks in power may cause malfunction. It is also advised not to touch the plug in these circumstances as it may cause an electric shock.

INSTALLATION LOCATION (GENERAL)

Do not install the monitor where sudden temperature changes may occur, or in humid, dusty or smoky areas as it may cause fire, electric shock or damage. You should also avoid areas where the sun shines directly on the monitor.

DO NOT PLACE THE MONITOR IN A HAZARDOUS POSITION

Ensure that you do not place any heavy objects on the monitor, and that all cables are routed to avoid possible injury.

MAINTAIN GOOD VENTILATION

Ventilation slots are provided to keep the monitor from overheating. Covering the slots may cause fire. Allow a 10cm space between the rear of the monitor chassis and rear enclosure wall or panel to allow adequate air circulation.

DISCONNECT THE CABLES WHEN YOU MOVE THE MONITOR

When you move the monitor, turn off the power switch, unplug the monitor and be sure the signal cable is disconnected. If you do not disconnect them, it may cause fire or electric shock.

CAUTION!

The Power cable connection is the primary means of detaching the system from the power supply. The monitor should be installed close to a power outlet, which is easily accessible.

UNPLUG THE MONITOR

If the monitor is not in use for a long period of time it is recommended that it is left unplugged to avoid accidents.

HOLD THE PLUG WHEN DISCONNECTING

To disconnect the power cable or signal cable, always pull it by the plug. Never pull on the cable itself as this may cause fire or electric shock.

DO NOT TOUCH THE PLUG WITH WET HANDS

Pulling or inserting the plug with wet hands may cause electric shock.

ERGONOMIC RECOMMENDATIONS

To eliminate eye fatigue, do not operate the monitor against a bright background or in a dark room. For optimal viewing comfort, the monitor should be just below eye level and 40-60 cm (16-24 inches) away from your eyes. When using the monitor over a prolonged time, a ten-minute break every hour is recommended as looking at the screen continuously can cause eyestrain.

Cleaning

To protect the LCD panel, protective glass or touch screen do not scratch or rub the screen with a hard object.
Never use the following strong solvents. These may damage the enclosure and the LCD screen.

Thinner
Benzene
Abrasive cleaner
Wax
Acid or Alkaline solvent

Stains can be removed with a cloth lightly moistened with a mild detergent solvent. Then wipe the cabinet with a soft dry cloth.

Periodic cleaning with a soft dry cloth is recommended.

3. Installation

Contents

The following accessories are included with the DEFENDER*. Check to see if they are enclosed with your monitor. If anything is missing or damaged, please contact Displaylite or your supplier.

UK AC power cord (optional Euro power cord)
VGA signal cable
Composite video & DVI-D (Video or DVI-D versions when ordered)
User's manual
CD-ROM - Touch screen driver software (touch screen versions when ordered)
AC to 12VDC power supply (PSU) (enclosed within cradle)
Cradle for power supply (attached to rear of display)

** Remember to save your original box & packing material to transport or ship the monitor.*

Power cord

Use a power cord that matches the power supply voltage of the AC power outlet being used. The power supply cord you use must have been approved by and comply with the safety standards of your country.

UK
In UK, use a BS approved power cord with moulded plug having a black (5A) fuse installed for use with this monitor.

Europe
Power cord type H05VV-F should be used.

19” Rack mount

The **DEFENDER RM** (rack mount) is designed to be installed in a 19” EIA compatible equipment rack and is mounted into the rack without the use of 19” rack mount slides runners.

Panel mount

The **DEFENDER PM** (panel mount) is designed to be front mounted into a cut-out. The front panel is secured by M4 studs and M4 nuts (not supplied).

Warning! Do not over tighten the M4 nuts as this can damage the studs.

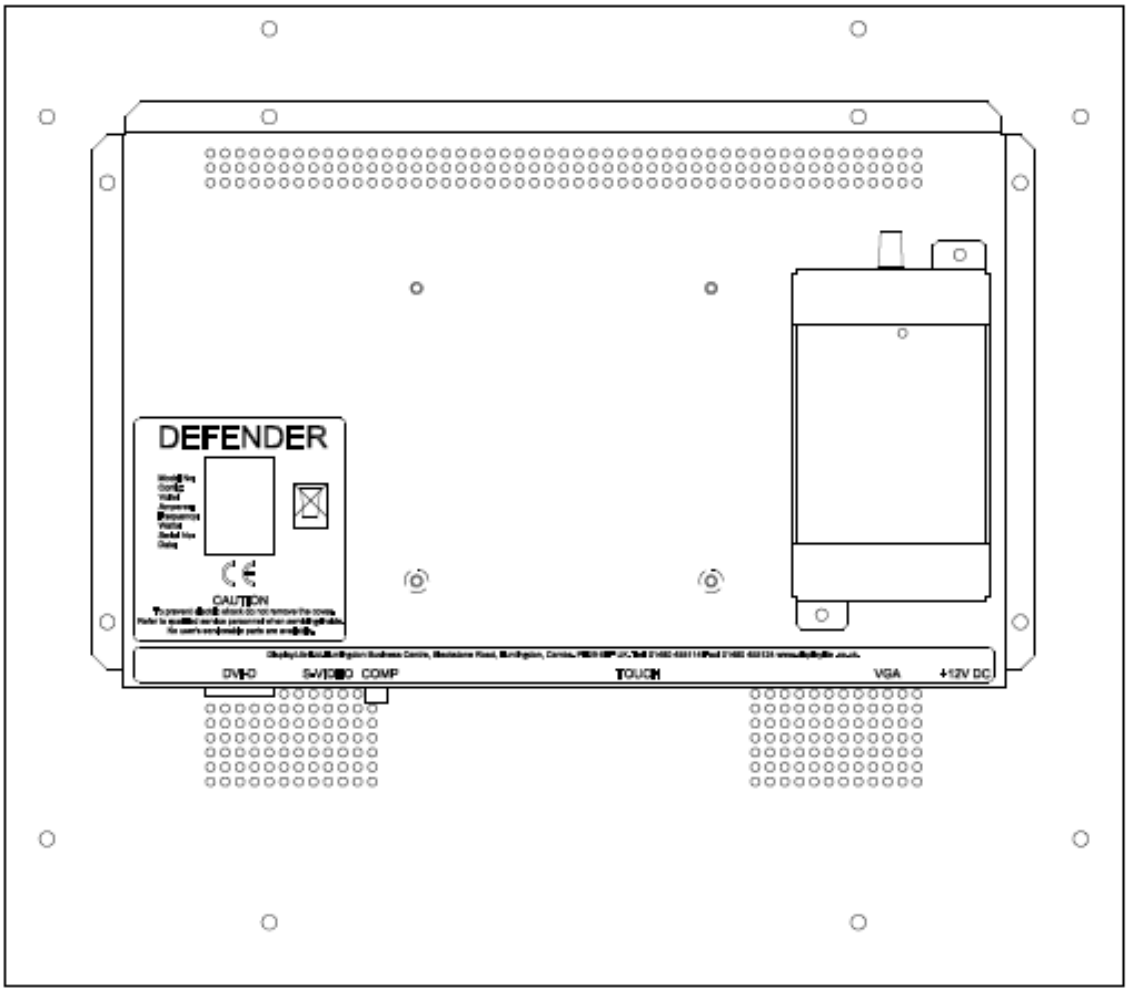
Metal case

The **DEFENDER MC** (metal case) is designed to be free standing on a desk or wall mounted using a suitable VESA compliant stand or bracket. The desk stand or wall bracket is secured by 4 x M4 screws (supplied).

Open frame

The **DEFENDER OF** (open frame) is designed to be enclosed inside a kiosk or console using the brackets provided with the monitor.

Connecting the monitor



Rear view of the DEFENDER

Signal source

Ensure that both the signal source (PC, video camera, DVD etc) and the DEFENDER monitor are switched off.

Connect the signal source to the DEFENDER monitor using the signal cable(s) provided.

The select (input) button selects the correct input source e.g. VGA, CVBS, S-Video or DVI-D.

Touchscreen (optional)

Install the touchscreen software drivers provided on the CD-ROM, on to your PC. Follow the installation instructions provided on the CD. Connect the touchscreen data cable (USB or Serial RS232) provided between the DEFENDER and your PC.

Power

Connect the 12VDC power connector from the AC to 12VDC power supply (PSU) to the DEFENDER monitor first. Then connect the AC power cable the PSU.

4. Operation

OSD (ON SCREEN DISPLAY) CONTROL BUTTONS

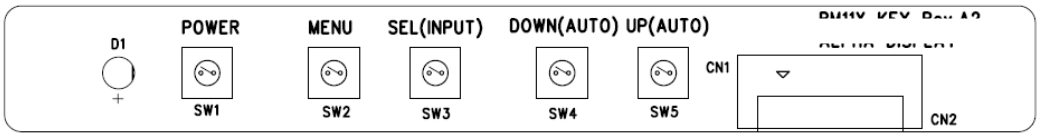
Depending on which version of the DEFENDER you purchased, the 5 control buttons are mounted either on the front panel or rear case. NOTE: The orientation of the buttons varies between front and rear mounted controls

Keypad layout

Front mounted OSD membrane (front mounted)

Down(Auto) Up(Auto) Sel(Input) Menu Power LED

Rear mounted OSD buttons (rear mounted)



Direct Buttons	**POWER**	Power On and Off
	MENU (M)	1. Enter into Main Menu or Exit out of Main Menu 2. Exit from Sub Menu to Main Menu
	SELECT (S)	1. Move to next OSD Menu item on Main Menu or Sub Menu. 2. Executes the OSD Menu item such as 'Auto Adjust' on OSD Menu.
	UP (>)	1. Enter from Main Menu to Sub Menu. 2. Select the control item to change the value of selected menu. 3. Increases the value of selected OSD Menu item.
	DOWN (<)	1. Decreases the value of selected OSD Menu item.
Hot Buttons	**UP+DOWN *(Auto Adjust)***	1. Executes 'Auto Adjust' to optimise the picture *(Analog VGA input only)*
	SELECT (S)	1. Selects the signal input source (VGA, CBVS, S-Video or DVI-D)

OSD main menu & control functions

Main Menu	Sub Menu	Control Description
PICTURE	**Brightness**	Adjust the brightness of the display.
	Contrast	Adjust the contrast of the display.
	H Position	Adjust horizontal position of the displayed image.
	V Position	Adjust vertical position of the displayed image.
	Phase	Adjust pixel phase of the displayed image.
	Clock	Adjust pixel clock of the displayed image.
	Auto Adjust	Optimise all the picture adjustments automatically.
COLOUR	**Colour Temp.**	Change the colour tone of the display
	Red	Adjust the RED colour temperature.
	Green	Adjust the GREEN colour temperature.
	Blue	Adjust the BLUE colour temperature.
	Auto Colour	Set the colour balance automatically *(Analog VGA only).*

OSD	**OSD H Position**	Move the location of the OSD menu horizontally.
	OSD V Position	Move the location of the OSD menu vertically.
	OSD Timer	Specifies the time span before the OSD menu disappears.
	Transparency	Adjust the transparency of OSD Menu window.
MISC	**Language**	Select the OSD Language. (English, German, French, Spanish, Korean)
	Recall	Recall (reset to) the default factory settings.
	Input Select	Select the current input source. (VGA & DVI-D version)

How to use the OSD menu

e.g.) Adjust CONTRAST control on PICTURE main menu

a. Press <MENU> button on OSD membrane switch pad. (OSD Menu should appear on the screen - PICTURE Main Menu)
b. Press <UP> Button to navigate to the Sub Menu. (Selected brightness sub menu)
c. Press <SEL> key to go to the contrast Sub Menu.
d. Press <UP> key to enable the contrast value change (High-Lighted Value on contrast Sub Menu)
e. Press <DOWN> key to decrease or press <UP> key to increase the adjust value.
f. Press <MENU> key to disable the contrast value change.
g. Press <MENU> key to exit to Sub Menu and Press it again to exit the Main Menu.

5. Trouble shooting

The following information provides guidance notes for trouble shooting

No picture

- Check correct signal input source has been selected.
- The signal cable should be completely connected to the display card/computer.
- The display card should be completely seated in its slot.
- Check the power to the monitor and computer is on.
- Check to make sure that a supported mode has been selected on the display card or system being used.
- Check the monitor and your display card with respect to compatibility and recommended settings.
- Check the signal cable connector for bent or pushed-in pins.
- Check the signal input.

Image persistence

- Image persistence is when a 'ghost' of an image remains on the screen after the monitor has been turned off. Unlike CRT monitors, LCD monitors' image persistence is not permanent.
  To alleviate image persistence, turn the monitor off for as long as an image was displayed. For example, if an image was on the monitor for one hour and a residual image remains, the monitor should be turned off for one hour to erase the image.

Image is unstable or unfocused

Signal cable should be completely attached to the computer.

- Use the OSD, image adjustment controls to focus and adjust display by increasing or decreasing the clock and phase. When the display is changed, the OSD image adjust settings may need to be re-adjusted.
- Check the monitor and your display card with respect to compatibility and recommended signal timings.
- If your text is garbled, change the video mode to non-interlace and use 60 Hz refresh rate.

LED on monitor is not lit (no green or flashing green can be seen)

- Power cord should be connected and power button on monitor keypad should be pressed

LED on monitor is flashing green

- Refer to **NO PICTURE**

Display image is not sized properly

- Use the OSD image adjustment controls to increase or decrease the H.SIZE.
- Check to make sure that a supported mode has been selected on the display card or system being used (please consult display card or system manual to change graphics mode).

6. General information about LCD monitors

The following symptoms are normal and do not indicate a problem.

When you first turn on the LCD monitor, the picture may not fit in the display area because of the type of display source that is used. Select auto adjust to adjust the picture to its correct position.

You may find slightly uneven brightness on the screen depending on the desktop pattern you use.

Due to the nature of the backlight, the screen may flicker during initial use. Turn off
the power to the monitor and then turn it on again.

If you have to return your unit for service and the original packaging has been discarded, please contact Displaylite for advice or replacement packaging.

7. Specifications

MODEL	DEFENDER 31	DEFENDER 38	DEFENDER 43	DEFENDER 48
Screen Size	12.1" (31.0cm)	15.0" (38.0cm)	17.0" (43.0cm)	19.0" (48.0cm)
Type	TFT	TFT	TFT	TFT
Viewing Area mm	246.0 x 184.5	304.1 x 228.1	337.9 x 270.3	376.6 x 301.0
Brightness cd/m2	400	250	300	300
Aspect Ratio	4:3	4:3	4:3	4:3
Contrast Ratio	500:1	450:1	1000:1	700:1
Viewing Angle	130° Horizontal/ 110° Vertical	130° Horizontal/ 110° Vertical	160° Horizontal/ 160° Vertical	160° Horizontal/ 160° Vertical
Frequency (H)	30 - 61	30 - 61	30 – 80	30 - 80
Frequency (V)	50 - 75	50 - 75	50 - 75	50 - 75
Max. Resolution	800 x 600 @75Hz	1024 x 768 @75Hz	1280 x 1024 @75Hz	1280 x 1024 @75Hz
On Screen Menu	Power, menu, select, up, down	Power, menu, select, up, down	Power, menu, select, up, down	Power, menu, select, up, down
Signal Inputs	Standard: 15pin D-type Optional: DVI-D, Video: RCA, & S-video	Standard: 15pin D-type Optional: DVI-D, Video: RCA, & S-video	Standard: 15pin D-type Optional: DVI-D, Video: RCA, & S-video	Standard: 15pin D-type Optional: DVI-D, Video: RCA, & S-video
Power Requirements	12VDC Supplied with external 110VAC – 240VAC PSU	12VDC Supplied with external 110VAC – 240VAC PSU	12VDC Supplied with external 110VAC – 240VAC PSU	12VDC Supplied with external 110VAC – 240VAC PSU
Power Consumption [W]	40	40	50	60
Temperature (operating) [℃]	0 to 50	0 to 50	0 to 50	0 to 50
Ambient Humidity (operating) [%]	10 to 80 (Non-condensing)	10 to 80 (Non-condensing)	10 to 80 (Non-condensing)	10 to 80 (Non-condensing)
Dimensions [mm] (W x H x D) Excluding PSU	TBC	RM: 482.6 x 310 x 70.7 PM: 420 x 340 x 70.7 MC: 359 x 299 x 68.9 OF: 357 x 295.5 x 67.9	RM: 482.6 x 355 x 70.7 PM: 475 x 405 x 70.7 MC: 384 x 338 x 68.9 OF: 382 x 336 x 67.9	RM: 482.6 x 400 x 70.7 PM: 500 x 417 x 70.7 MC: 424 x 367 x 68.9 OF:357 x 366 x 67.9
Weight [kg]	TBC	RM/PM: 7.0 MC: 5.6 OF: 5.0	RM/PM: 9.0 MC: 7.0 OF: 6.5	RM/PM: 9.5 MC: 8.0 OF: 7.5
Protective Glass (without touchscreen)	Standard: 3mm thick Anti-glare	Standard: 3mm thick Anti-glare	Standard: 3mm thick Anti-glare	Standard: 3mm thick Anti-glare
Touchscreen Options	Resistive, Capacitive or Surface wave USB or Serial controller	Resistive, Capacitive or Surface wave USB or Serial controller	Resistive, Capacitive or Surface wave USB or Serial controller	Resistive, Capacitive or Surface wave USB or Serial controller
Approvals	CE	CE	CE	CE
Options	24/48VDC power input Customised versions	24/48VDC power input Customised versions	24/48VDC power input Customised versions	24/48VDC power input Customised versions

NOTE: Technical specifications are subject to change without notification.

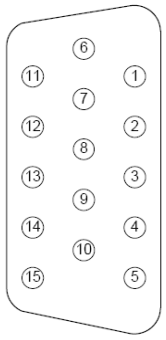
Appendix

Standard Display Modes

No	Mode	Resolution	Horizontal		Vertical		Pixel clock
			Frequency	Polarity	Frequency	Polarity	
1	VGA	640 x 350	31.78 KHz	P	70.0 Hz	N	25.175 MHz
2		720 x 400	31.47 KHz	N	70.0 Hz	P	28.324 MHz
3		640 x 480	31.47 KHz	N	60.0 Hz	N	25.175 MHz
4		640 x 480	35.00 KHz	N	66.7 Hz	N	30.240 MHz
5		640 x 480	37.86 KHz	N	72.8 Hz	N	31.500 MHz
6		640 x 480	37.50 KHZ	N	75.0 Hz	N	31.500 MHz
7	SVGA	800 x 600	35.16 KHz	N / P	56.3 Hz	N / P	36.000 MHz
8		800 x 600	37.88 KHz	P	60.3 Hz	P	40.000 MHz
9		800 x 600	48.08 KHz	P	72.2 Hz	P	50.000 MHz
10		800 x 600	46.87 KHz	P	75.0 Hz	P	49.500 MHz
11		832 x 624	49.73 KHz	N	74.6 HZ	N	57.284 MHz
12	XGA	1024 x 768	48.36 KHz	N	60.0 Hz	N	65.000 MHz
13		1024 x 768	56.49 KHz	N	70.1 Hz	N	75.000 MHz
14		1024 x 768	60.02 KHz	P	75.0 Hz	P	78.750 MHz
15	SXGA	1280 x 1024	63.97 KHz	P	60.0 Hz	P	108.050 MHz
16		1280 X 1024	79.98 KHz	P	75.0 Hz	P	135.000 MHz
Note: 1. Modes 15 – 16 apply to the DEFENDER 43 & 48 only. DEFENDER 38 Modes 1 – 14. DEFENDER 31 Modes 1 – 10.							

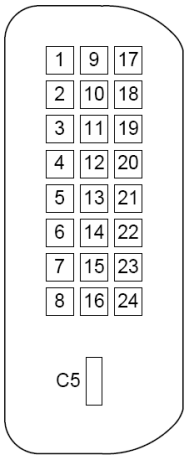
Connectors pin assignment

15 Pin D-SUB Connector



1	Red	9	+5V
2	Green (SOG in)	10	Ground - Sync
3	Blue	11	No Connection
4	Ground	12	DDC Serial Data
5	Ground	13	Horizontal or Composite Sync
6	Ground - Red	14	Vertical Sync
7	Ground - Green	15	DDC Serial Clock
8	Ground - Blue		

DVI-D Connector (optional)



1	TMDS Data 2-	14	+5V Power
2	TMDS Data 2+	15	Ground (for +5V)
3	TMDS Data 2/4 Shield	16	Hot Plug Detection
4	TMDS Data 4-	17	TMDS Data 0-
5	TMDS Data 4+	18	TMDS Data 0+
6	DDC Serial Clock	19	TMDS Data 0/5 Shield
7	DDC Serial Data	20	TMDS Data 5-
8	No Connect	21	TMDS Data 5+
9	TMDS Data 1-	22	TMDS Clock Shield
10	TMDS Data 1+	23	TMDS Clock+
11	TMDS Data 1/3 Shield	24	TMDS Clock-
12	TMDS Data 3-	C5	Ground
13	TMDS Data 3+		